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Institutional and individual investors: Saving for old age

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Abstract

This paper brings together the academic literature on individual and institutional investors in order to understand the nature of difficulties faced by them and set the background for the Special Issue. This introductory article and the papers in the Special Issue contribute to the debate on how to support individuals in their savings commitments and investment decision-making and whether and how institutional investors have fulfilled their role in supporting the development of the funded pension industry. There are three main conclusions: (i) individual investors are not ready for the role that has been assigned to them in the pension industry, (ii) institutional investors are a long way short of establishing healthy relational contracts and trustworthy relationships with their clients, and (iii) more effective regulation may be needed.

JEL classification: G22, G23, G24, G11, D14, D15

Keywords: Institutional investors; Individual investors; Pension funds; Defined benefits, Defined contributions, Retirement investments

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1. Introduction

The past four decades have witnessed an unprecedented shift away from state to private pension provision. As the unsustainability of the pay-as-you–go (PAYGO) system became increasingly apparent (Veall, 1986; Lambrecht, Michel and Vidal, 2005), funded non-state pensions started to become the main form of old age provision (Disney, 2000; Whiteford and Whitehouse, 2006; Perotti and Schwienbacher, 2009). In addition, as defined benefit[2] (DB) schemes started to be replaced by defined contribution[3] (DC) schemes, a further shift towards placing the responsibility for pension provision on individuals took place. It has been argued that these changes were necessary to provide a sustainable income for an aging population, and to stimulate economic growth and development of financial markets (Demirguc-Kunt and Levine, 1995; Catalan et al., 2000; Vittas, 2000; Davis and Steil, 2001; Walker and Lefort, 2001; Harichandra and Thangavelu, 2004). However, it became increasingly clear that the vision of pension reform as an effective tool with which to stimulate economic and financial development was overly optimistic (Singh, 1996; Impravido et al., 2003; Chan-Lau, 2004; Roldos, 2004; Zalewska, 2006). Moreover, it transpired that funded pensions might not be able to fulfil their role in securing retirement income, regardless of whether the pension schemes were public (i.e. provided by public bodies to their employees), corporate (i.e. provided by corporations to their employees) or individual (i.e. provided to individual investors by financial institutions with or without contributions from those investors' employers).

There are two major drivers behind this problem. First, individuals/households have not been saving enough for retirement, despite the numerous changes aimed at attracting long-term savings commitments. Second, returns on savings are not sufficient to guarantee a comfortable income at retirement. Two strands of the academic literature on pensions develop these issues. One is concerned with the saving attitudes and abilities of individuals. The other deals with the characteristics of the institutional environment. This Special Issue unites both strands, helping us to understand the problems that individuals face when saving for old age, and contributing to the debate on how to improve the retirement prospects of individuals. Some of the proposed solutions are country specific, but many have cross-border relevance. The common theme

[2] Defined benefit (DB) is a pension plan in which a sponsor (often the employer) promises specified pension payments or a lump sum (or a combination of them) on retirement. The amount to be paid is predetermined by a formula that takes into account the contributor's earnings history, tenure of service and age.

[3] Defined contribution (DC) pension plans collect money from individuals (and sometimes their employers/sponsors) in order to invest that money until each individual's retirement. The amount available at retirement depends on the returns on these investments (after the payment of fees to the investment company managing the fund).

stemming from this research is that a better institutional environment is essential if pension reforms are to succeed. Given the widespread evidence that individuals are unable to plan and manage their long-term finances, the institutional environment needs to be improved to provide better support for individuals and to facilitate the long-term stability of the pension system.

The remainder of this paper is organised as follows: first, we set out the arguments for pension reform and the introduction of funded pension schemes. A successful pension system requires individuals to save and make appropriate financial decisions within a sound institutional structure. So, we go on to discuss why individuals find it difficult to commit to a savings regime sufficient for their retirement and to make sound, long-term financial decisions. We then review the evidence on whether institutional investors have been adequately supporting individuals in their efforts to secure retirement income, and explore the factors that may have contributed to those outcomes currently observed. We close with a summary and suggestions for future policy measures.

2. Background

The structures of pension systems in many developed countries are the result of centuries of evolution. For instance, in the UK, the tradition of occupational pensions goes back to the thirteenth century and the industrial revolution had a significant impact on the sector's growth and development. Similarly, in the Netherlands, the within-industry focus of occupational pensions can be traced back to the country's powerful guild houses in the seventeenth century. In France and Germany, on other hand, the dominant position of the state and its role in providing social security have played a significant role in the relative underdevelopment of corporate and personal pensions. In many developing countries, the structure of the funded pension industry has been established only in the last few decades as part of fundamental market reforms (e.g. in the post-Soviet countries of Central and Eastern Europe). Therefore, the structures of pension industries are country specific, with some systems relying heavily on DB occupational pensions while others are dominated by DC personal schemes.[4]

In the 1980s, when the issue of an aging population, additionally magnified by the presence of 'baby boomers', started to surface, many countries with large occupational DB

[4] See Perotti and Schwienbacher (2009) for a discussion of the political origins of pension funding.

schemes started to reform their systems to reduce the proportion of DB schemes and replace them with DC schemes (e.g. 401(k) schemes in the US, personal pension schemes in the UK and the KiwiSaver scheme in New Zealand) or some hybrids of DB and DC schemes (e.g. the Netherlands). Academics supported this movement, stressing the benefits of funded pension schemes (Samwick and Skinner, 2004; Börsch-Supan, 2005; Poterba et al., 2007; Andersen and Bhattacharya, 2017) and advising on the best ways of transforming the pension industry (Thaler and Benartzi, 2004; Feldstein, 2005; Miles and Černý, 2006; Døskeland and Nordahl, 2008; Broeders and Chen, 2010; Cocco and Gomes, 2012; Shi and Werker, 2012; Aggarwal and Goodell, 2013), but also pointing out certain weak elements of the newly introduced reforms (Poterba et al., 1995; Disney, 2000; Lachance et al., 2003; Lindbeck and Persson, 2003; Brown, 2008; Maurer, 2015; Fabozzi, 2015; Zalewska, 2017).

Parallel to the research focused on economy-wide consequences, a separate strand of research investigated the impact of pension reform on individuals. Here, the support for reform seemed less strong. For instance, there is evidence that a reduction of pension benefits, an increase in the retirement age or an increase in uncertainty with regard to retirement benefits negatively affect individuals. Montizaan et al. (2016) show that a reduction in pension rights reduced the motivation of Dutch workers. De Grip et al. (2012) argue that the introduction of a requirement to work one additional year in order to maintain pension rights or retire at the pre-reform age with reduced benefits had a negative impact on Dutch workers' mental health. Haverstick et al. (2010) provide evidence that the replacement of DB by DC schemes reduced American workers' commitment to their jobs. They show that workers with between five and ten years of tenure at a firm were 23 percent more likely to leave a job offering a DC plan than one offering a DB plan. Gerrans and Clark (2013) suggest that age plays an important role in voluntary switching from DB to DC schemes, with older workers being more negative about switching than younger workers. This finding is consistent with Schrager (2009), who argues that younger workers may feel more positively inclined towards DC schemes than older workers because they have potentially higher expected job turnover and wage variability.

Consequently, to encourage individuals to switch from DB to DC schemes, some regulators have introduced guarantees of minimum pension payments/rate of return for DC schemes. Lachance et al. (2003) discuss a hypothetical fair price of an option permitting DC plan participants to buy back their DB benefit. They show that the market value of such an option could constitute up to 100 percent of DC contributors' working life contributions, which sheds some light on the potential cost of avoiding the risk that contributors face in DC schemes. Obviously, strong preferences for DB schemes partly rely on the expectation that such

schemes' providers will be able to keep their promises. There are, therefore, good reasons for ensuring that DB schemes recover from the financial shortfalls they are currently facing.

However, the financial soundness of DB schemes should not be taken for granted as these shortfalls are considerable. For instance, the deficit of public US DB schemes alone reached $3.8 trillion in mid-2017,[5] which is equivalent to over 25 percent of the value of all the investments of US pension funds.[6] In the UK, DB scheme underfunding—at £0.9 trillion in mid-2016—was equivalent to approximately 50 percent of all UK pension funds' investments.[7]

Potential problems with the funding of DB schemes have been discussed for decades. It is recognised that the level of contributions should be aligned with the promised benefits (see, e.g. Huberman and Sung, 1994, 2005; Josa-Fombellida and Rincón-Zapatero, 2004, 2006) and that contributions should be smoothed over time to help sponsors with financial decisions (Thaler and Benartzi, 2004). Boes and Siegman (2017) propose adopting nominal loss-aversion in an adjustment mechanism. They propose introducing an intergenerational insurance fund that would mitigate potential shortfalls of pension outcomes relative to a reference point of retirement benefits while insurance premiums would be collected only in situations where intermediate pension wealth was at an all-time high. They argue that designing a pension system that uses a high-water mark for insurance contributions would avoid nominal decreases in pension capital, and would also avoid direct transfers between active contributors and those already retired. Consequently, this new system would help to restore individuals' confidence in the DB scheme and impact positively on participation.

Boosting participation and trust in the system is fundamental for the success of pension reforms. Even though the funded pension industry has grown significantly, the need for increased coverage and additional savings is still enormous. According to the OECD (2016), the value of the assets of private pension funds in 20 OECD countries and 24 non-OECD countries reached, collectively, $38 trillion (or 51 percent of world GDP) in 2015. Yet this is dwarfed by the shortfall in the world's pension budget. According to a report by Citi (2016), the 20 largest OECD countries alone have, collectively, a $78 trillion shortfall in funding PAYGO and DB public pensions' obligations. This shortfall is nearly 1.8 times the value of their published collective national debt. So if DC schemes are to develop further, it is essential

[5] "US faces crisis as pension funding hole hits $3.85tn", Financial Times, 15 May 2017.
[6] According to the OECD (2016), the total investment of US pension funds was $14.25 trillion in 2015.
[7] "UK's pension funding hole hits £900bn after Brexit", Financial Times. 26 June 2016. The OECD (2016) reports that UK pension funds' investments amounted £1.82 trillion in 2015.

that individuals' participation, long-term commitment and ability to make adequate financial decisions are strong. The next section discusses the barriers to achieving this.

3. Individual investors

3.1. Myopia and financial literacy

The economic literature on time preferences recognises that individuals may invest too little, either because they are myopic or, even when they do recognise the time inconsistency of preferences, because they face constraints induced by their own future choices. This means that individuals' resistance to saving for old age may be part of human nature, and that if this is so, appropriate policies need to be put in place to encourage individuals to plan for retirement. Therefore, it is important to understand what forms of encouragement—and under what conditions—are most effective in promoting participation in pension schemes and whether the solutions that have been adopted are effective.

Although it is widely recognised that individuals need a bit of a 'push' to start saving for old age, there is no consensus as to the form such a push should take. Indeed, different countries have adopted different degrees of intervention. While in some countries contributions to funded pension schemes remain voluntary (e.g. in the UK and the US), in others they are predominantly mandatory (e.g. in the Netherlands, Chile and Poland) or quasi-mandatory (e.g. Denmark).[8] However, even in countries where, historically, contributing to funded pensions has been voluntary, automatic enrolment has started to gain ground, with the aim of offsetting the resistance of individuals with regard to retirement savings and of increasing savings rates.

Biljanovska and Palligkinis (2017) strongly support the idea of automated transfers to saving accounts as a valuable tool for helping households commit to the plans they themselves have made. They also argue that providing households with adequate and comprehensible financial information is important for households' financial planning, as it supports their ability to plan, monitor and commit to pre-set goals. Moreover, they assert that it is important that individuals are taught how to plan, as the ability to plan is essential in setting goals and achieving them. Biljanovska and Palligkinis' (2017) research provides a valuable extension to the earlier research on how to motivate individuals to save for old age and how effective the

[8] In Denmark, contributions to occupational pension schemes are not mandatory by law, as employers contribute only voluntarily to pension funds. In practice, however, such contributions are rendered mandatory thanks to the collective, mainly industry-wide, agreements that exist between social partners.

chosen methods are. For instance, Madrian and Shea (2001) document that automatic enrolment significantly increased the rates of participation in 401(k) schemes. However, the authors also highlight a high level of passivity among investors, showing—for example—that although automatic enrolment increased participation rates, automatically enrolled individuals did not adjust the saving rates and allocations initially established by their employers. This tendency to go for default options is also documented by Clark et al. (2016), who study the 2011 pension reform in the state of Utah (USA). They find that over 60 percent of employees affected by the reform did not choose their pension plan in an active manner, and consequently ended up with the default option. Those 'inactive' employees were also less likely to enrol in any supplementary pension scheme.

Following from this argument, and given the inherent resistance of individuals to saving for the future and the tendency to postpone such decisions, it is of vital importance that we understand what institutional environment could be created to motivate individuals to start saving and to support them in their saving commitments.[9] To achieve such an understanding, it is important to understand both the decision-making processes of households and individuals and their responsiveness to particular forms of 'external' help. El-Attar and Poschke (2011) highlight the importance of *trust*. Iyengar and Kamenica (2010) and Goldreich and Hałaburda (2013) stress the importance of the manner in which the relevant information is presented to individuals. They argue in favour of simplicity and understandability. Cobb-Clark et al. (2016) provide evidence that having an 'external' person delegated to look after retirement savings is less effective than households having an 'internal' person responsible for the task. Stolper (2017) sheds new light on this matter. He highlights the importance of a personalised approach to individuals if one wishes to influence their financial decision-making and commitments. Standardised financial advice is not effective in motivating individuals to make financial decisions. The author finds that two-thirds of his sample of 6,000 German households completely ignored the financial advice given to them, and that those who took that advice into account followed it to only a limited degree. Stolper (2017) observes that financial literacy if anything makes individuals less likely to pay attention to standardised advice, which further highlights the inadequacy of a standardised approach.

The importance and impact of financial literacy on investment behaviour and attitudes is another important strand of the pensions literature. As it is recognised that the level of financial literacy is low, even in developed countries, in which the general level of education is high

[9] A comprehensive discussion of other important aspects of household finance can be found in Haliassos (2015).

(see, e.g. Lusardi and Mitchell, 2006, 2007, 2011; Lusardi et al., 2014; Atkinson and Messy, 2011; van Rooij et al., 2011; Dushi and Honig, 2015; Lusardi and Tufano, 2015),[10] two strands of research lead the field: one is concerned with factors affecting financial literacy (e.g. Sundén and Surette, 1998; Gamble et al., 2015; Finke et al., 2017) and the other with its effects and consequences (e.g. Alexander et al., 1998; Bailey et al., 2011; Korniotis and Kumar, 2011; Bucher-Koenen and Ziegelmeyer, 2014; Guiso and Viviano, 2015; Grinblatt et al., 2015). In the context of retirement savings, it is well understood that financial literacy is positively correlated with wealth and the quality of financial decision-making. The positive impact on wealth at retirement is achieved through better retirement planning (see, e.g. Almenberg and Säve-Söderbergh, 2011; Fornero and Monticone, 2011; Sekita, 2011) and a comparatively higher proportion of equity investments (see van Rooij et al., 2012), better market timing skills (see Guiso and Viviano, 2015), a better understanding of, and a higher sensitivity to, changes in investment risk (see Bateman et al., 2014, 2016) and better international diversification (see Bekaert et al., 2017). Jappelli and Padula (2015) stress the importance of financial literacy being achieved early in life.

Many studies do not directly test for the effects of financial literacy as data on the financial literacy of individuals are hard to obtain (see, e.g. Bekaert et. al., 2017), instead using the size of salaries and seniority of posts as proxies for it. Conclusions from this research are consistent with the notion that financial literacy matters, statistically and economically. For instance, Agnew et al. (2003) argue that male, higher-income and higher-seniority individuals invest more in equity. Agnew (2006) concludes that higher-salaried individuals are better at diversification. He claims that they invest less in their employers' stock, and are less likely to adopt 'naïve' diversification—that is, to invest equal proportions in the assets included in their 401(k) portfolios. Interestingly, Agnew (2006) also finds that women make better choices than do men. However, given the pay gap between men and women, it is possible that the $100,000 earning threshold used in the study may have resulted in the selection of much more educated women than men in the same earning categories, which may have driven the result.

Despite the changing pensions environment and efforts made to improve individual investors' awareness, the level of financial literacy and the understanding of the specifics of personal finance in the general population remain low, and do not seem to be improving over time. Alessie et al. (2011) conclude that financial literacy did not improve in the Netherlands

[10] For individual country studies, see the Special Issue of the *Journal of Pension Economics and Finance*, October 2011.

between 2005 and 2010. Dushi and Honing (2015) study perceptions of DC contributions in three cohorts over a longer time horizon. They look at individuals who were aged between 51 and 56—that is to say, 10–15 years short of retirement, in 1992, 1998 and 2004. They conclude that regardless of the time differences and the level of coverage of DC schemes (which increased considerably between 1992 and 2004), the three cohorts significantly and comparably overestimated their level of DC contributions. In particular, the absolute difference between respondent-reported and social security earnings record contributions was approximately 1.5 times larger than the mean contribution in the earnings records.

Given that the level of financial literacy is important for sound financial decision-making—but that it has been and is likely to remain low—it is imperative to ask what the possible consequences of developing a pension system that produces retirement incomes heavily dependent on individuals' investment decisions are. Ahmed et al. (2017) offer an important insight into this issue. They study the potential wealth effects of giving investors the freedom to decide when and in which assets to invest, as opposed to enforcing an 'imposed' 50–50 allocation between equity and bonds. They argue that giving investors the freedom of investment can deliver superior performance only when these investors have the 'knowledge, skills and discipline to select optimal investment portfolios'. They argue that limiting investment choices is preferable, given that such skills and commitment cannot be expected from the average investor. In particular, their simulations show that the risk of the potential retirement income from the private retirement account (PRA) system falling below that currently promised by the US Social Security System is nearly 35 percent at the age of 68 when individuals are given the freedom to decide with regard to what equity they invest in and to the proportions of their portfolios allocated to bonds and equity. In contrast, the risk is less than 18 percent when individuals invest in the 'standardised' 50–50 portfolio of equity and bond indexes.

3.2. Investor behaviour

While a standardised investment allocation may be better than the 'erratic' decisions of poorly informed individuals, the question of what is the best standardised asset allocation remains an open one. In this section, we discuss the literature concerned with (i) optimal and actual asset allocation, (ii) the consequences of investment practices, and (iii) factors affecting investment preferences.

It is commonly accepted that long-term and short-term investment strategies should differ from one another; however, there is little consensus as to what they should be. It is also commonly accepted that optimal retirement investments are not straightforward and may be determined by many factors (see, e.g. Campbell and Viceira, 2002; Love, 2013; Cochrane, 2014). Bagliano et al. (2014) add to the debate by pointing out that the commonly accepted positive relationship between individuals' portfolio proportions invested in risky assets and their time to retirement may not hold when there is uncertainty about social security pensions and labour income. The authors argue that when individuals suffer labour income shocks and cannot rely on state pensions to support them upon their retirement, they should increase their allocation in risky assets before retiring. Further, Menoncin and Scaillet (2003) show that it is optimal for individuals to maintain or even increase equity holdings during the early years of their retirement. They argue that the proportion of bond holdings should decline over time during the accumulation and, especially, during the decumulation years, while the proportion of bonds held in risk-free assets should increase.[11] Therefore, as reliance on DC schemes increases, it is important to understand the investment practices of individual investors in order to ascertain whether they diverge from theoretical predictions.

There is plenty of evidence that individuals struggle with the idea of active investment and asset diversification, and that those who have better investment skills enjoy better returns (Dahlquist et al., 2017). Not surprisingly, individuals prefer DB to DC schemes and show little initiative with respect to making conscious investment decisions (see, Haverstick et al., 2010; Gerrans and Clark, 2013; Clark et al., 2016). They also shy away from equity investments. Gustman et al. (2010) document that Americans aged 53 to 58 in 2006 had only 15.2 percent of their wealth in stock held directly, in DC plans, or in individual retirement accounts (IRAs). Farrell and Shoag (2016) find that the asset allocation of individual investors' DC schemes is similar to that of the DB schemes offered by their (public body) employers, although one can expect that the risks associated with DB and DC schemes, respectively, are fundamentally different. Benartzi et al. (2007) confirm the inefficient asset allocation of 401(k) accounts and, in particular, their weak diversification. They claim that some 11 million contributors voluntarily invest at least 20 percent of their retirement savings in their employer's stock.

The problems with appropriate decision-making do not stop on the day of retirement. Deciding how to convert retirement savings into streams of retirement income is both important

[11] Accumulation refers to the period during which contributions are collected, decumulation to the period during which pensions are being paid.

and nontrivial. The fact that financial literacy declines with age (Fernandes et al., 2014; Gamble et al., 2015) potentially adds to the problem. Hubener et al.'s (2014) model of optimal asset allocation suggests that couples should rely heavily on joint annuities. Koijen et al. (2011) also support this dominant position of annuities, but stress that given that annuities are not risk free and depend on the state of the economy, households should allocate their savings to nominal, inflation-linked, and variable annuities.

Although theory predicts that individuals ought to find annuities attractive, the empirical evidence shows that this is not necessarily the case, and measures aimed at 'smoothing' retirement income do not seem to appeal to households. Inkmann et al. (2011) find that the demand for annuities is positively related to life expectancy, financial wealth and education. Moreover, that demand depends on the existence of other retirement income and on the probability of a bequest to a surviving spouse. Benartzi et al. (2011) confirm that the demand for annuities is driven by many factors and that the observed low levels of annuitisation may not reflect the true preferences of individuals, being driven instead by the institutional environment and institutional constraints.

The influence of the investment environmental on individuals' decision-making sheds additional light on our understanding of the investment abilities and practices of individual investors, and it may not be entirely individuals' 'fault' if their decisions appear 'irrational'. First, it is important to recognise that decisions to save depend on economic and market conditions (see, e.g. Acemoglu and Scott, 1994; Ludvigson, S.C., 2004). Second, risk attitudes are also, to some extent, the result of these external conditions. For instance, trust is one of the fundamental factors that explains participation in financial markets (see, e.g. Ballock et al., 2015; Ricci and Caratelli, 2017). El-Attar and Poschke (2011) show that households with lower trust invest more in housing and less in financial assets, especially those that are more risky. This is consistent with the argument, raised by Cao et al. (2011), that under-diversification, and hence home and local bias, can be explained by individuals' 'fear of change and uncertainty'. Consistent with this argument, Lindblom et al. (2017) find that native locals (i.e. locals who were born in the district they live in) are almost three times more locally biased than other locals (i.e. residents of a district who were born outside that district) in terms of their average equity investments. In particular, place of birth is an important determinant of the portfolio choice of individual investors born in urban districts. However, this local or birthplace bias does not affect the performance of investments. The authors document abnormal returns for sophisticated investors—that is, those who held more diversified portfolios—regardless of whether those investors were birthplace-biased or not.

A high level of bias towards 'familiar' assets is also well documented for 401(k) investments (e.g. Benartzi, 2001; Benartzi et al., 2007). While some blame individuals for this obvious lack of diversification (see, e.g. Tang et al., 2010), others point the finger at the behaviour of employers and at the options offered to employees. In particular, Rauh (2006) shows that there was a significant decline in holdings of employers' stock in Delaware (USA) following the validation of poison pills and staggered boards by the state. This suggests that the 'voluntary' holding of employers' stocks may be the result of encouragements pursued by employers themselves. Elton et al. (2006) blame employers for creating inadequate investment opportunities within 401(k) schemes. They argue that only 53 percent of the plans offer an adequate set of options and that over a 20-year period offering inadequate options makes a difference in terminal wealth of over 53 percent. Further, Elton et al. (2007) argue that restrictions imposed by retirement savings plans that limit employees to investing in one fund family are likely to result in significant wealth loss. They show that within-family funds have higher correlations than across-family funds, and—therefore—increase the risk of investments and reduce diversification benefits.

It is also well recognised that individual investors are sensitive to how and what information is presented to them (see, e.g. Bateman et al., 2014, 2016). Iyengar and Kamenica (2010) argue that giving people many investment options, especially when they do not understand them, will result in simpler options being chosen. In other words, the number of options available may affect the quality of the decisions made. Presenting investment opportunities in a simple—that is to say, understandable—manner is critical for informed decision-making. The authors conclude that investment risk is not the main investment criterion for individual investors. Individuals choose fixed-income and money market funds rather than equity funds because, when faced with many investment options that they do not understand, they prefer simple options. Also, Huberman and Jiang (2006) find that individuals invest evenly across different types of funds and are not sensitive to the investment opportunities they are offered, tending to invest in only three to four funds regardless of the number of funds available to them (which, in their study, varies between 4 and 59).

It seems, therefore, that employers would be doing a better job if they offered a small range of well-diversified options rather than a wide range of options that investors simply do not understand, and consequently shy away from. Educating individuals about their rights and opportunities creates a positive attitude towards saving and investing for old age (see, e.g. Madrian and Shea, 2001; Choi et al., 2011). It is thus of vital importance that individuals, who—by nature—find committing to long-term savings, understanding financial concepts, and

comprehending available investment options difficult, get appropriate support in planning and investing for old age. Here, institutional investors have an important role to play, and the next section discusses the current state of knowledge on the subject.

4. Institutional investors

Institutional investors represent individual investors in the sense that they make investment decisions and invest on the latter's behalf. In the case of DB schemes, individuals do not need to be directly involved in the decision-making process with regard to which assets savings should be invested in in order to deliver a retirement income determined by salary (final or average) and years of contributions. Theoretically, the responsibility for ensuring that pension liabilities do not exceed the value of accumulated assets remains with the sponsor. In practice, depending on the nature of the sponsor—that is, whether they are public or corporate, and the manner in which pension assets are protected should a sponsor go bankrupt—the responsibility for the underfunding of DB schemes may spread far beyond a pension's sponsor and its employees.

In the case of DC schemes, the effects of investment decisions are fully passed on to individual investors, but it is not always the case that investment decisions are solely in the hands of those same individual investors. In some DC pension plans (e.g. self-invested personal pensions in the UK), individuals have a relatively high level of involvement in investment decision-making, while in others (e.g. NEST portfolios available in the UK to small and medium-sized companies and to the self-employed), they can only choose from a narrow range of portfolios run by asset management companies that offer pension schemes. Individual investors often also have limited monitoring rights.

Regardless of whether a pension scheme is DB or DC, institutional investors should act in the best interests of their clients. In the case of DB schemes, this implies a 'sufficient' rate of return to guarantee that pension schemes can meet obligations, and in the case of DC schemes that the expected returns do not fall short of those promised when the contract was signed. Additional constraints on investment objectives might occur in the case of DC schemes with minimum-rate-of-return guarantees. There is, therefore, no reason to expect that the investment objectives and practices of DB and DC schemes will be similar, or that similar rates of return can be achieved by each type of scheme. Moreover, in an additional layer of

complexity, there may be considerable differences in the factors that determine the quality of the services provided.

Regardless of the scheme's form, there is always the possibility that asset managers will not act in the best interests of their clients. To a certain extent, the problems arising from the separation of pension management and pension rights are similar to the agency conflicts discussed in the corporate governance literature. Pension managers have their own objectives, which may be driven by short-term preferences, while contributors may have a more long-term focus.

Numerous papers have been written on how to define the objective functions of institutional investors and the constraints they face. Here, we focus on a discussion of issues relevant in the context of pension investments.[12] First, we summarise the optimal asset allocation literature, then we discuss empirical papers that document the investment strategies and asset allocation of pension funds.

4.1. Optimal asset allocation

It is commonly accepted that optimal asset allocation should involve a mix of asset classes with different risk characteristics (often stocks and bonds), although there is little agreement as to the exact proportions and how these vary over time. Keeping the value of pension assets close to the value of pension liabilities seems a natural recommendation for DB schemes. Sundaresan and Zapatero (1997) argue that DB schemes should construct two portfolios, one replicating pension liabilities, the other a growth portfolio for the surplus.

Hainaut and Deelstra (2011) recognise that the level of underfunding affects optimal investment decisions. In particular, they postulate that an underfunded fund should take a short position in cash and invest it in bonds and equity. Josa-Fombellida and Rincón-Zapatero (2010) come to a similar conclusion, and argue that when underfunding is significant it may be optimal to increase the risk of investments by borrowing money and investing it in bonds and stocks. The relative proportions of bonds and stocks depend on their correlation. Josa-Fombellida and Rincón-Zapatero (2012) further stress that 'topping up' underfunded schemes should be accompanied by increased risk-taking with regard to asset allocation. In periods of financial distress, however, going short with cash in order to finance pensions may not always be

[12] For surveys of the optimisation literature, see Sundaresan (2000) and Brandt (2010).

feasible. Indeed, if a sponsor's poor corporate performance and poor pension investment performance coincide, low-risk pension investments may seem more appropriate (Broeders, 2010). Similarly, a sponsor's preference for low-risk investments may be driven by its desire to build financial slack, especially in times of financial hardship. Bodie et al. (1987) argue that if a sponsor wants to build up financial reserves, investing in high-liquidity assets seems reasonable and that this will lead to low-risk investment strategies. Moreover, increased risk-taking by financially distressed sponsors may not be a sign that sound investment decisions are being taken. Given that it is common to have an external protection system that offers some kind of guarantee of a minimum pension, sponsors facing bankruptcy and/or the closure of a pension scheme may have an incentive to engage in risk-shifting by adopting more risky investment strategies (see, e.g. Sharpe, 1976; Treynor, 1977; Harrison and Sharpe, 1983).

Additional difficulties arise when pension funds close the door to new investors. Such funds cannot benefit from intergenerational risk sharing or from having members with heterogeneous investment horizons, indexation preferences and investment policies. Battocchio et al. (2007) argue that the investment strategies employed for the accumulation and decumulation phases, respectively, need to be considered jointly, although each may be different. The authors confirm the traditional wisdom that the allocation in risky assets should decline during the accumulation phase, but claim that the opposite is true during the decumulation phase—that is to say, that investment in risky assets should increase over time since members' anticipated future life spans decline. They also argue that, given their assertion that the investment strategies of the accumulation and decumulation phases should be considered jointly, it is important that funds that are closed to new contributors are run by the same type of management during their decumulation phase as ran them during their accumulation phase. For instance, if a closed fund was internally managed during its accumulation phase, it should remain internally managed during its decumulation phase. Further, investment strategies depend on a fund's level of funding, and therefore should not, the authors state, rely on externally taken decisions that ignore the current state of the fund. In other words, asset management should not be outsourced during either phase.

In the case of DC schemes, the main factors discussed in the literature as affecting optimal asset allocation strategies include uncertainty regarding the inflow of cash contributions during the accumulation stage, the longevity of individuals, uncertainty about interest rates, and the form of pension benefits to be adopted at the retirement date (see, e.g. Boulier et al., 2001; Deelstra et al., 2000; Cairns et al., 2006). The more non-deterministic factors in a model, the more complex optimal trading strategies become. For instance, to

replicate the optimal asset allocation, Cairns et al. (2006) show that when interest rates are deterministic, it is sufficient to use two efficient mutual funds—one dominated by equity to fit the risk preferences of investors, the other dominated by cash to hedge the salary risk. If stochastic interest rates are introduced, it becomes necessary to enrich the optimal asset allocation by adding a fund that hedges against interest rate risk. The authors also argue that although cash and bonds can both be considered low-risk investments, given their different hedging properties they should not be treated as 'close' substitutes; rather, cash should be replaced by bonds over time.

Gao (2008), on the other hand, concludes that when the terminal value of the portfolio is to be maximised, the optimal asset allocation strategy is to decrease investments in stocks (slightly) and bonds (aggressively) and to increase the proportion of risk-free investments. Han and Hung (2012) come to a very similar conclusion, differing only in that they also have an indexed bond as a fourth potential investment instrument. They conclude that the proportion invested in the risk-free asset and indexed bonds should increase over time. They allow for cash borrowing to finance these investments, and construct an example that allows the proportion of borrowed cash in the initial portfolio to reach as high as -40 percent.

While some postulate that taking more risks may be beneficial, and even desirable, warnings with regard to risk-shifting remain valid. In particular, the presence of external guarantees may induce moral hazard and result in more risky strategies (Romaniuk, 2007).

4.2. Investment strategies in practice

The performance of DB asset managers has attracted a fair amount of research, with some documenting poor performance (see, e.g. Beebower and Bergstrom, 1977; Blake et al., 1999, 2002; Clare, Cuthbertson and Nitzsche, 2010) and some claiming that asset managers do a good job (see, e.g. Brown et al., 1997; de Haan and Kakes, 2011; Aglietta et al., 2012).

While it can be argued that sponsors should have regard for the financial soundness of their pension schemes, it is well recognised that in practice this may not be entirely true. Distortions may arise from the misalignment of pension fund managers' preferences with those of the funds' contributors, but they may also result from official policies or from the regulatory framework. Such distortions may lead to increased or decreased risk-taking by sponsors.

For instance, a tax system may create arbitrage opportunities and, hence, incentives for lower risk-taking by sponsors. Black (1980) and Tepper (1981) argue that, in the case of US corporations, it may be optimal to invest entirely in fixed-income securities to maximise tax

arbitrage opportunities. Frank (2002) shows that corporations' decision to invest DB assets in bonds is consistent with this theoretical prediction. She does not find the effect in the case of DC schemes, where such tax benefits do not apply.

It is also argued that accounting standards impact risk-taking and investment strategies. In particular, the rate used to discount pension liabilities is an important factor in determining risk incentives. The US is an interesting case because the discount rate used to calculate DB pensions' liabilities is related to the expected rate of return on assets (see, e.g. Novy-Marx and Rauh, 2009, 2011; Pennacchi and Rastad, 2011; Mohan and Zhang, 2014; Novy-Marx, 2015; Andonov et al., 2017). Andonov et al. (2017) argue that US public pension funds, as a result of their incentives, invest more in risky securities than do Canadian, European and even US private pension funds, which are subject to different liabilities accounting rules. Moreover, they claim that the level of risk-taking is a positive function of the level of underfunding per participant and is negatively associated with fund performance. Novy-Marx and Rauh's (2009) results suggest that the 2008 financial crisis cannot be blamed for the high level of public pensions' underfunding observed in post-financial crisis years. The results show that, as of December 2008, public pensions in 50 US states were underfunded by in total approximately $3.23 trillion (as compared with $1.94 trillion worth of assets) when market-based discount rates that reflect the risk profile of the pension liabilities were adopted in the calculations.[13]

Another potential influence on risk-taking is discussed by Boubaker et al. (2017). They look at the impact of monetary policies, and in particular of low interest rates and the decline in Treasury yields, on the risk-shifting behaviour of pension funds. They conclude that changes in Treasury yields following changes in the Fed's target interest rates coincided with a substantial increase in pension funds' allocation to equities, which is consistent with structural risk-shifting.

In Europe, interestingly, prolonged low interest rates have not resulted in excessive risk-taking by pension funds. Indeed, following the financial crisis a general trend towards lowering investment risk set in. The Bank of England (2014) warns that 'funding shortfalls have intensified (the adoption of) short-term performance measures' with the effect that long-term investors are increasingly unable to invest in line with their long-term horizons'. This potential for overinvestment in lower-risk, fixed-income securities is itself related to pension fund accounting. In particular, a fund's performance, and hence its level of funding, is tied to its benchmarks' performance measured quarterly. Volatile equity markets make equity

[13] For a discussion of discounting of pension liabilities/assets see Brown and Pennacchi (2016).

investments unattractive when regulation requires sponsors to maintain a high level of funding at all times.

Another strand of the pensions literature is devoted to understanding the behavioural aspects of asset allocation and risk-taking. Some of these factors are common to public and corporate schemes, but others are specific to the nature of the sponsor.

Bradleya et al. (2016) and Andonov et al. (2017) claim that state pension funds are politically biased and that this affects their asset allocation and risk-taking. In particular, they show that there is a positive relationship between the numbers of politically affiliated trustees on boards and risky asset allocations. Hochberg and Rauh (2013) document a bias of public pension funds towards in-state, 'politically-friendly' projects, investment in which does not seem justifiable by economic arguments alone. Also, Wang and Mao (2015) claim that public pensions' board members use their influence to enhance their political capital, as their shareholder activism increases with the number of board members running for election to public office.[14]

In the case of corporate DB schemes investment decisions are not free from distortion either. An et al. (2013) argue that the risk-taking of corporate DB schemes is related to sponsors' default risk and underfunding of the schemes. Atanasova and Gatev (2013) argue that there are significant differences in the magnitude and determinants of the risk-taking of pension plans sponsored by publicly traded and privately held companies, respectively. The effect of the funding status of pension liabilities on risk-taking is two and a half times higher for plans with publicly traded sponsors than for plans with private sponsors. In contrast, changing sponsors' contributions has a more than four times greater effect on risk-taking for plans with private sponsors than for plans of publicly-traded sponsors. These results suggest that the alignment of incentives for the stakeholders in a pension contract is different for plans sponsored by private and publicly-traded companies, respectively.

Although both corporate and public pension funds seem to take more risk when underfunded, Mohan and Zhang (2014) show that, consistent with the risk transfer hypothesis, public bodies' DB schemes undertake more risk when underfunded than do corporate pension funds.

Opting for risky strategies may or may not be beneficial. Rauh (2009) concludes that risk-taking may be associated with higher returns. He finds that poorly funded DB schemes invest

[14] In general, corporate governance is found to play a significant role in risk-taking for both public and corporate DB plans (Cocco and Volpin, 2007; Phan and Hegde, 2013).

more in government debt and cash, while well-funded funds of highly rated companies invest more in equity. He argues that risk-shifting plays a considerably smaller role than the desire to limit costly financial distress. Dyck and Pomorski (2016) found that investing in high-risk asset classes delivered superior performance. They also found that pension funds that kept larger holdings in private equity outperformed those with small holdings in the 1990s and in the first decade of the new millennium.

However, a different conclusion is reached by Andonov et al. (2017), who argue that higher risk-taking is associated with lower returns. The poor performance of US public pension funds is also documented by Hochberg and Rauh (2013), who study overinvestment in local private equity projects. Such a local, in-state focus delivered 2–4 percent lower performance than similar out-of-state investments and similar projects within the same state but conducted by out-of-state investors. This bias towards 'politically friendly' projects reduced public pension funds' resources by $1.2 billion a year.

The increasing burden of US public pensions over the period 2002–11 is documented by Peng and Wang (2017). They discuss differences across the 50 states and argue that the level of employees' contributions has played an important role in increasing the gap between asset values and liabilities. Even though the importance of aligning the level of contributions with pension labilities is well documented in the finance literature (see, e.g. Haberman and Sung, 1994, 2005; Josa-Fombellida and Ricón-Zapatero, 2004, 2006), politicians and policymakers are reluctant to see the former increase (see, e.g. Brown et al., 2011; Schieber, 2011). And this applies to contributions made both by employees and by employers.

Any proposed increase in the retirement age or the levels of employees' contributions, or any decrease in retirement benefits, is accompanied by lengthy debate and negotiation. The case of CalPERS is illustrative of the problem. Although its funding ratio has been one of the lowest in the US (just 68 percent in 2016) and the SB 400 legislation that promised highly generous pensions to public sector employees has contributed hugely to this state of affairs, it seems virtually impossible that new laws restricting benefits and increasing contributions will be passed.[15]

There are also problematic incentives in the case of employers' contributions. Splinter (2017) argues that the reduction of contributions made by states significantly contributed to the

[15] "California's Pension Funding Crisis Just Got Worse", Fortune, 19 July 2016, http://fortune.com/2016/07/19/pension-underfunded/.

level of underfunding of US public pensions. State governments seem to prefer to reduce their pension contributions rather than increase taxes or reduce spending.

In the case of corporate schemes, Davis and de Haan (2012) find that unprofitable and smaller Dutch firms contribute less to their pension funds than do profitable and larger firms. Moreover, contributions are positively correlated with leverage, suggesting that tax effects play a role. Still, Dutch DB schemes are considered to be amongst the best funded and most sustainable pension systems in the world (Mercer, 2016; OECD 2016).[16] There are several potential explanations for this assessment. Tight regulation, further strengthened after the collapse of markets following the bursting of the dot-com bubble in 2000–02, may be one of the key factors behind the current strength of the Dutch pensions industry. In particular, Dutch regulators' requirement that pension funds be fully funded at all times has had a significant impact on risk-taking and on the asset classes that pension funds have been investing in. It has pushed Dutch pension funds towards liability-driven investment (LDI) strategies that hedge liabilities against interest rate risk, and has tilted portfolios towards bonds and derivatives, in particular swaps. The widespread adoption of LDI strategies turned out to be a good way of operating in the low interest rate environment that followed the financial crisis, and had a great impact on protecting pension pots in the Netherlands.

In the case of DC schemes, asset managers are subject to weaker constraints and are, when it comes to investment decisions, potentially less influenced by trustees and corporate boards than are DB schemes. Therefore, their investment skills and performance may be more comparable with those of individual investors. It is commonly claimed that institutional investors have better skills and resources, leading to performance that outstrips that of individual investors (see, e.g. Lakonishok and Maberly, 1990; Dorn and Huberman 2005; Barber and Odean, 2008; Barber et al., 2009; Gennaioli et al., 2015; Guiso and Viviano, 2015). Yet, institutional investors, including DC pension funds, are far from perfect in terms of their investment abilities, practices and, in particular, treatment of clients.

The literature on investment practices and the performance of DC pensions overlaps heavily with the literature on mutual funds, given that mutual fund research is dominated by studies of the US market and 94 percent of American households investing in mutual funds treat these investments as pension pots.[17] However, parallel to the mutual funds strand of the

[16] To be more precise, the Dutch system is a DB–DC hybrid (see Ponds and van Riel, 2007).
[17] According to a survey by the Investment Company Institute, 94 percent of 52.3 million American households investing in mutual funds treat these savings as a means of financing retirement (Investment Company Institute, 2011).

literature, there also are studies devoted to 'pure' pension fund investments, and these will be the focus of this section.

The relatively poor performance of pension fund investments has been documented by many (see, e.g. Ippolito and Turner, 1987; Lakonishok et al., 1992; Ambachtsheer et al., 1998; Ferson and Khang, 2002; Hinz et al., 2010; Petraki and Zalewska, 2017). The general picture issuing from this research is that asset managers are not particularly skilled or hard-working, even if they are doing a decent job. The limited ability of contributors to monitor funds' performance adds to the problem. Therefore, although in the case of DC schemes the responsibility of sponsors (corporate or public) may not stretch as far as guarantees of retirement income, sponsors carry considerable weight in the process of ensuring that employees obtain high-quality services from the asset managers running those DC schemes. Sialm et al. (2015) and Pool et al. (2016) find that DC sponsors play a crucial role in deciding when to include or remove funds from the menu of options available to their employees. They also find that sponsors have a preference for keeping funds with good past performance and low expenses, contrasting with the literature that shows that individual investors fall prey to mutual funds that charge high fees but do not necessarily deliver the quality of performance necessary to justify those fees (see, e.g. Alexander et al., 1998; Khorana and Servaes, 2012).

The protection arising from the market power of employers, even when they are not the sponsors of DC schemes, is an important factor affecting the performance of such schemes. Zalewska (2017) studies differences in the performance of UK DC schemes offered as group personal pensions and those offered as individual personal pension schemes.[18] Group personal pensions benefit from better monitoring and better investment options. The author shows that funds operating under group agreements statistically and economically outperform funds operating under individual agreements, have tougher performance benchmarks when there is scope for discretion, and are better at tracking these benchmarks. These results show that pension providers discriminate against less powerful (in the sense of bargaining power) and less knowledgeable individuals in a manner similar to that in which other financial intermediaries, like banks and mutual funds, take advantage of their clients (see, e.g. Cavalluzzo et al., 2002; Christoffersen and Musto, 2002; Collin and Baker, 2005; Houge and

[18] Group personal pensions are schemes that are negotiated with a pension provider by an employer for its employees, even though the contract is signed by the employees and the provider alone. Employers also oversee the performance of these funds, and may change providers if they are unsatisfied with the current provider's performance. Individual personal pensions are offered directly to individuals by pension providers; no formal bodies monitor their performance or negotiate the quality of the contracts on offer.

Wellman, 2007; Gil-Bazo and Ruiz-Versy, 2009; Beck and Brown, 2015; Palia, 2016; Shirley and Stark, 2016). Moreover, given that wealth managers' performance is positively related to monitoring pressure (see, e.g. Almazan et al., 2004; James and Karceski, 2006; Adams et al., 2017), it is particularly important to ensure that proper monitoring is in place if one wishes to build trust and increase the wealth of individuals.

Getting the right incentives in place is another difficulty when attempting to build a successful DC system. This applies both to setting appropriate benchmarks and to managerial remuneration and career furtherance procedures. The importance of setting benchmarks against which to assess performance in a meaningful manner is well documented in the finance literature (see, e.g. Lakonishok et al., 1992; Blake, Lehmann and Timmermann, 1999; Dor et al., 2003; Chan et al., 2009; Petraki and Zalewska, 2017; Christoffersen and Simutin, 2017). However, in the case of pension funds, where long-term performance determines the size of retirement pots but short-term assessment is used to remunerate and promote managers, setting appropriate benchmarks is even more tricky than it is for mutual fund investments.

Moreover, it is important to ensure that other types of incentives are also in place. The mutual funds literature provides some insight into how investment teams should be structured and monitored. And even if mutual funds' investors differ from pension funds' investors in terms of their investment objectives and the manner in which they invest (see, e.g. Del Guercio and Tkac, 2002), the mutual fund literature may provide valuable lessons with regard to managerial incentives.

Given the complexity and size of pension portfolios, one of the central question is whether they should be solo- or team-managed. On one hand, one could argue that in solo-managed funds there is no scope for free-riding and internal conflicts; team-managed funds, however, may benefit from a greater diversity of skills. To add to the confusion, empirical findings are divided, with some studies preferring team-managed funds (see, e.g. Prather and Middleton, 2002; Bliss et al., 2008) while others conclude that solo-management is superior (see, e.g. Chen et al., 2004; Bär et al., 2011). Adams et al. (2017) contribute to this strand of the literature by asking under which conditions team-managed funds perform better than solo-managed funds. They argue that the quality and extent of the monitoring carried out by the board is fundamental to determining the performance of a fund, and that it is not enough to rely solely on the increased independence of directors as the ultimate measure of monitoring quality.

Remuneration is another potential way of addressing the asymmetry of information that exists between funds and contributors, although the corporate governance literature provides

convincing evidence that remuneration can be as much a cause of agency problems as a solution to them.

Ibert et al. (2017) show that the compensation of mutual fund managers is only very weakly related to performance, arguing that compensation is more related to firm-level characteristics than to individual talent. Ma et al. (2015) argue that the form of compensation matters, showing that managers with performance-linked bonuses exhibit superior fund performance, especially when advisors link pay to performance over a longer time period. In contrast, fixed salary, assets-based pay, or advisor-profits-based pay are not associated with superior performance.

5. Conclusions

This paper has brought together the literature on barriers individual investors face when saving for old age with that on whether institutional investors have fulfilled their role of supporting individuals in their efforts to save for retirement. It complements the articles in this Special Issue by providing background to the contributions of the various papers. Several clear messages have emerged during the course of this paper, and here we conclude by focusing in particular on the three main ones.

First, it is well documented that there has been a global move towards governments reducing their responsibility for, and involvement in, securing retirement income for their citizens, and a strong theme in the literature is that the average individual investor is not ready for the role that has been assigned to him or her—that is to say, individual investors do not save enough for retirement, do not have sufficient appetite for making investment decisions and have poor investment skills. Many papers claim that this situation stems from certain features inherent in basic individual preferences (e.g. myopia or risk aversion) and from the low level of financial literacy and investment skills present amongst individual investors.

Second, over the last four decades both the number and the scale of institutional investors in charge of funded pensions have grown enormously. The aforementioned changes in government policy and this growth of institutional investors are obviously in some way connected, and each has contributed to the growth in the literature that focuses on the characteristics and investment practices of institutional investors. The conclusions drawn from this literature are quite pessimistic, regardless of whether the studies are looking at public or at

corporate institutional investors, or whether they are assessing DB or DC schemes. The literature suggests that institutional investors often fail to deliver good returns, seem to be driven by goals that may not be optimal from the perspective of contributors, and even discriminate against less financially savvy ones. Institutional investors may, therefore, be a long way short of establishing healthy relational contracts and trustworthy relationships with their clients. Furthermore, the perceived 'poor' practice and performance of institutional investors both contribute to the lack of sufficient saving by individuals and to their unwillingness to engage in investment activities; so the two problems may be reinforcing one another. Thus, the fact that individuals display a certain lethargy with regard to their interactions with institutional investors may not be entirely their own fault.

Third, a large amount of research has been devoted to the question of how to improve this situation. It seems that a great deal of work on improving the understanding of financial concepts and of the benefits of diversification is needed at the individual investor level. Moreover, it seems critical to foster individuals' awareness of the investment options available. The research indicates that a more personalised approach may be the most efficient way of reaching out and achieving the desired outcomes. In addition, automatic enrolment, or even mandatory contributions, may be the right way forward, given the difficulties individuals experience with making and maintaining savings commitments. However, if individuals are to be 'forced' to save, it is essential that the pension system is sustainable, that institutional investors operate in the best interests of individuals, and that individuals are confident that this is the case. This suggests a more significant role for regulatory agencies. It is policymakers and regulators who must ensure that the existing distortions of incentives are removed or, at least, minimised. This may not be an easy task, since it will have to be addressed at the same time as dealing with the existing underfunding problem and reshaping existing portfolios. Given the scale of pension investments and liabilities, neither of these tasks is likely to be achievable without having a significant impact on financial markets. Therefore, more research is needed to inform us as to the best way forward.

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